

MONTANA'S PULSE INDUSTRY

HOW IT HAS DEVELOPED, ECONOMIC IMPACT & POTENTIAL FOR GROWTH (Executive Summary Version)

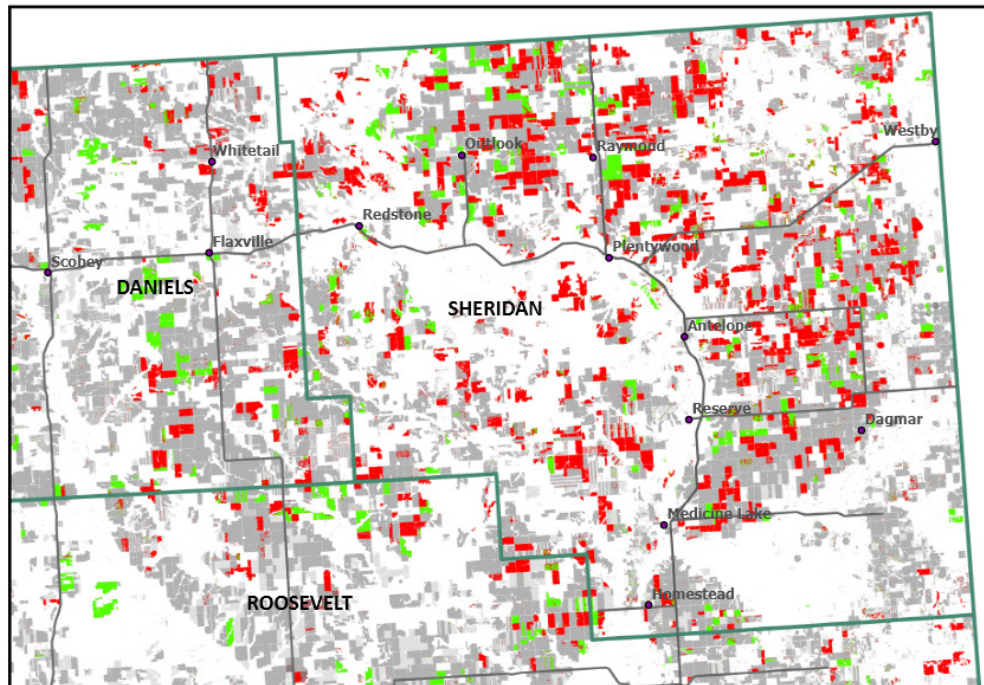
By:

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Montana Department of Agriculture

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2010 Northeast Montana - Sheridan County



■ Lentils
■ Peas

0 2.5 5 10 15 20 Miles

EXECUTIVE SUMMARY

For over a decade, the production of pulse crops (peas, lentils, and chickpeas) has seen substantial growth in Montana. Looking ahead, Montana is poised to become a world-class pulse production region as acreages continue to expand and as Montana's reputation for quality becomes increasingly recognized across the globe.

Pea acres increased from 35,000 in 1998 to 227,000 acres in 2010. Lentil acres increased from 16,000 acres in 1998 to 255,000 acres in 2010. In recent years, there has been some substitution of lentil acres for pea acres attributable to lentil's high profit potential. In 2011, Montana took over the lead in lentil and pea production in United States, accounting for over half of all lentil acres and nearly half of all pea acres. Pulse production in Montana is not a fad. The current level of production and industry investment is firmly rooted, and there are fundamental reasons why significant future growth may occur.

Northeastern Montana is the leading pulse production region in Montana, accounting for 75 – 80% of the state's pulse crop acreage. The story from Northeastern Montana is not how much pulse production has increased there; rather, that the farmers of Northeastern Montana raise pulse crops on cropland that they previously left fallow for a growing season. Between 1998 and 2010, Northeastern Montana farmers increased pulse crop production by 341,000 acres while decreasing fallow by 390,000 acres. "Fallow" refers to cropland left idle for a year in non-irrigated (dryland) cropping systems.

Peas and lentils have shallow roots and are very efficient in their use of soil moisture. Peas and lentils also fix nitrogen in the soil and provide significant rotational benefits that help break crop disease cycles. These attributes allow farmers to adopt more intensive crop rotations that reduce or eliminate fallow, add more acres of cash crop production, and improve cereal grain yield and quality (higher protein, better test weights) in the crops that follow.

An estimate of the economic benefits attributable to the 2010 pulse crop in Northeastern Montana is \$102 million. This estimate represents the incremental increase of economic activity relative to what would have occurred if the land planted in pulse crops was left in fallow (*as was largely the case before 1998*). Of this, \$85 million is directly associated to the impact of pulse crops replacing fallow. The remaining \$17 million is an estimate of the economic benefit that the 2010 pulse crop will have on the following wheat crop in terms of increasing yield and improving wheat protein levels.

There is significant potential for increased pulse production throughout Montana. If only 12.5% of Montana's 3.46 million acres of fallow was replaced with pulse crops, production would increase by over 430,000 acres, resulting in a near-doubling of Montana's record 2010 pulse crop. Within the next five to fifteen years, Montana's dryland pulse crop acreage could increase by 500,000 to 1,250,000 acres, without significantly changing wheat acreages. In situations where fallow is not replaced by pulse crops, pulse crops could displace some acreage of cereal grain crops. Increased pulse production may also occur on irrigated cropland, possibly in excess of 50,000 acres. Increased irrigated pulse production may play a critical role in encouraging the development of additional pulse processing facilities.

The economic benefits of expanded pulse production in Montana are substantial. Even a modest level of replacement of fallow by pulse crops would generate an economic benefit similar to what has been realized in Northeastern Montana. An illustration discussed in this paper shows that replacement of approximately 25% of Montana's fallow cropland with pulse crops could generate an annual economic benefit of about \$243 million (*based on recent market conditions*). Of this, approximately \$207 million

would be attributed to the replacement of fallow with pulse crops and \$36 million would be attributed to benefits affecting the following wheat crop.

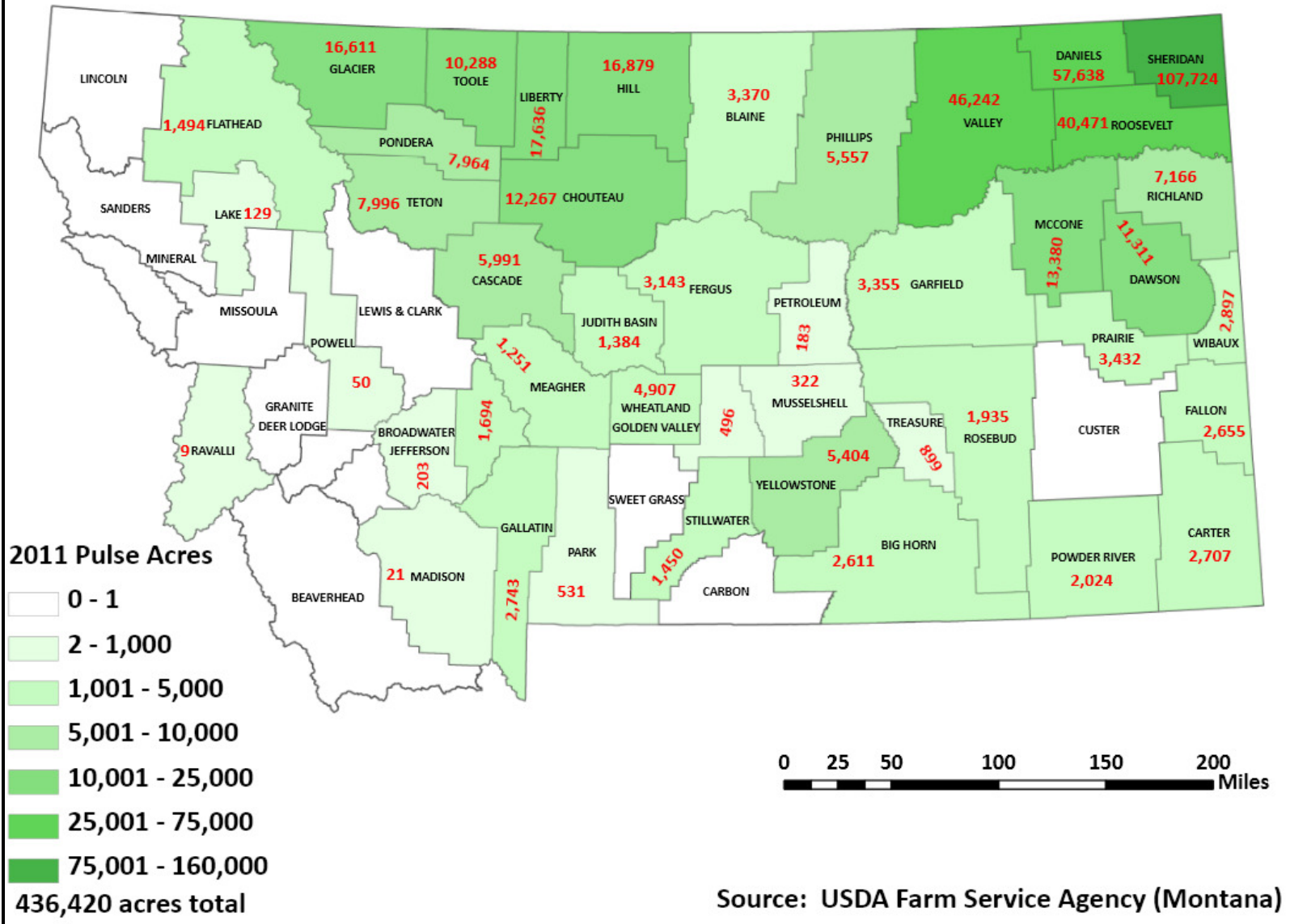
The economic benefits that may be realized if pulse crops replace dryland cereal grain acreage are more modest in comparison to pulse crops replacing fallow. The reason for this is that the change in economic activity and profits is incrementally smaller and the acreage involved would likely be less. Similarly, the economic benefits of increased irrigated pulse production are also modest in comparison. Irrigated cropland is already continuously cropped; so there is no fallow to displace. The acreage of irrigated cropland in Montana is also much smaller than dry cropland. However, the potential economic benefit of increased irrigated pulse production is significant, and increased irrigated pulse production may provide environmental services to society through decreased irrigation water withdrawal.

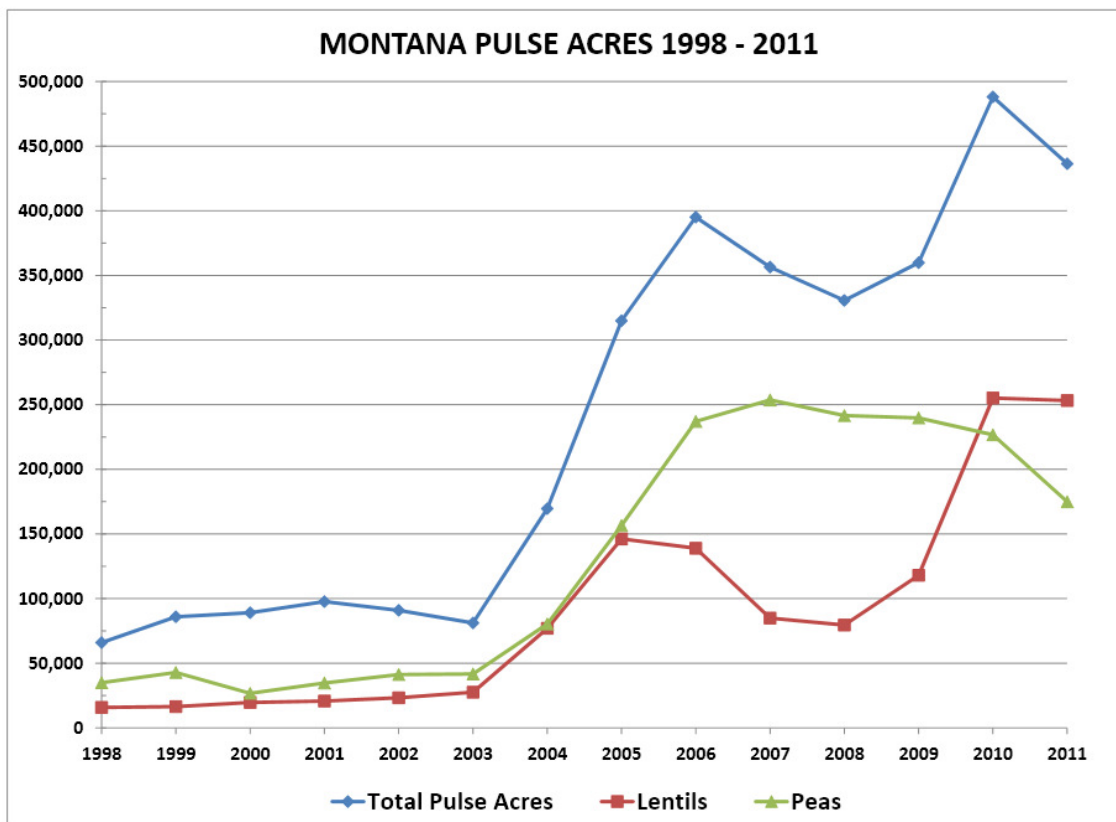
Pulse processing facilities help strengthen the market for pulse crops and contribute to Montana's economy. Pulse processing is often limited to cleaning and bagging, but also can include decorticating (taking the outer skin off), splitting, and pulse flour milling. Financial information is closely held by pulse processing companies, so only estimates can be made about the value added to pulse crops by facilities located in the state. An estimate explained in this paper discusses how pulse processing in Montana may have added as much as \$15 million in value to the 2010 pulse crop. Value added is allocated to wages, operating costs, capital investment recovery, taxes, shipping costs, and profits. As of December 2011, Montana had three large pulse processing plants, located in Plentywood, Chinook, and Hingham. The capital investment in these facilities may exceed \$10 million. The capacity of the existing processing facilities is not known, but it is reasonable to assume that each processing facility has the capacity to process 20,000 – 75,000 acres of pulse crops. Additional investment is scheduled for the facility located in Chinook. A processing facility is slated to be constructed in the near future at Tiber (west of Chester). Several companies are actively seeking to identify and secure sites for processing facilities in Montana or are evaluating future investments.

There are a number of factors driving expansion of the pulse industry. Global demand is being driven by population growth and economic gains in other parts of the world, particularly in India where dietary protein needs are not being met by domestic production and imports. Additionally, peas and lentils serve as less expensive substitutes for other pulses and beans grown in south Asia. Exports from the United States are not limited to south Asia and China; significant volumes are exported to countries in Europe, South America, Latin America, Africa, and the Middle East. In recent years, the world pulse supply has been tight because of demand factors, weather events, and loss of acres to other crops. This has encouraged the pulse industry and major importing countries to look for new sources of supply. The decline of the U.S. dollar has been useful in putting the U.S. in a better competitive position relative to major exporting countries like Canada and Australia. Efforts made in research and product development are close to paying off in creating substantial new demand for pulses in the United States and developed countries. Pulse crops have very favorable nutritional attributes that can address health issues such as heart disease, diabetes, weight control, digestive tract health, some types of cancer, food allergies, and pre-natal health. Pulses can be fractionated into highly functional components (protein, fiber, and starch) utilized as ingredients to enhance processed foods. Products made from pulse crops will have added market appeal in the developed world because they are economically, environmentally, and socially sustainable.

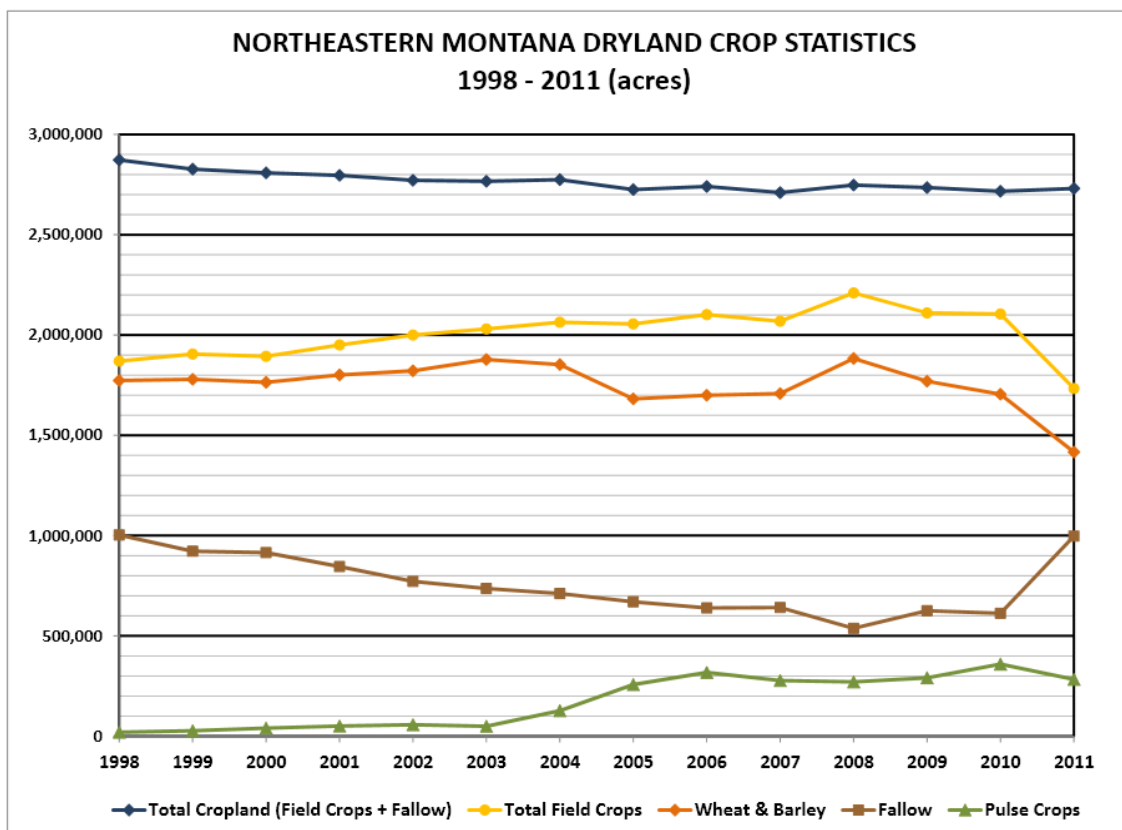
Clearly, Montana’s economy, farmers, and communities have a lot to gain from expanded pulse production; there may be no single opportunity available to Montana’s agricultural industry that offers as much potential benefit. It may be beneficial for Montana stakeholders and policy makers to review, consider, and prioritize actions that will assist Montana’s pulse industry reach its potential and do so in an expedited timeframe. Montana commodity check-off funds for pulses and cereal grains can be focused to address the opportunity to advance Montana cropping systems to replace fallow with pulse crops and utilize pulse crops to enhance cereal grain yields and quality. Escalating many facets of research impacting the pulse industry may yield a disproportionate level of benefit. Efforts to improve market reporting and dissemination of industry information would improve market transparency and could reduce the hesitation of farmers starting to raise pulse crops or expanding production. Additional efforts could further substantiate Montana’s reputation for high quality pulse crops and promote Montana as a premier origination point. Public-private partnerships and cooperation amongst pulse shippers may help address pulse shippers’ rail shipping challenges. Actions that would encourage further development of pulse processing and milling in Montana will not only generate economic activity and create jobs, but will provide for greater resiliency for volatility in prices and variability in crop quality. Montana’s pulse industry and policy makers can evaluate their level of engagement in federal policy development, which can influence the advancement of the United States pulse industry in numerous ways, such as research, crop insurance, conservation programs, school nutrition, and free trade agreements.

2011 Montana Pulse Crop Acreage





Source: USDA Farm Service Agency (Montana)

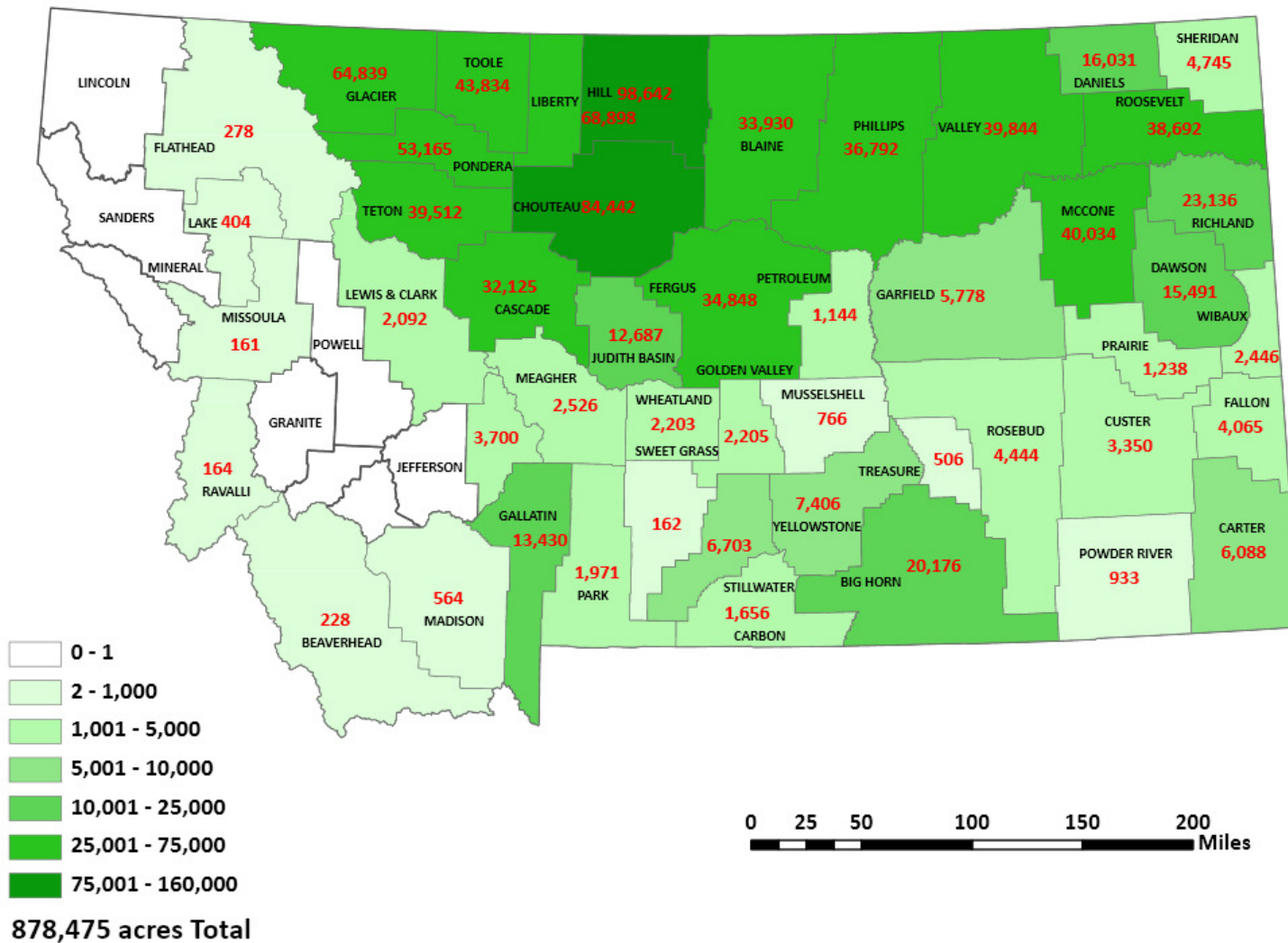


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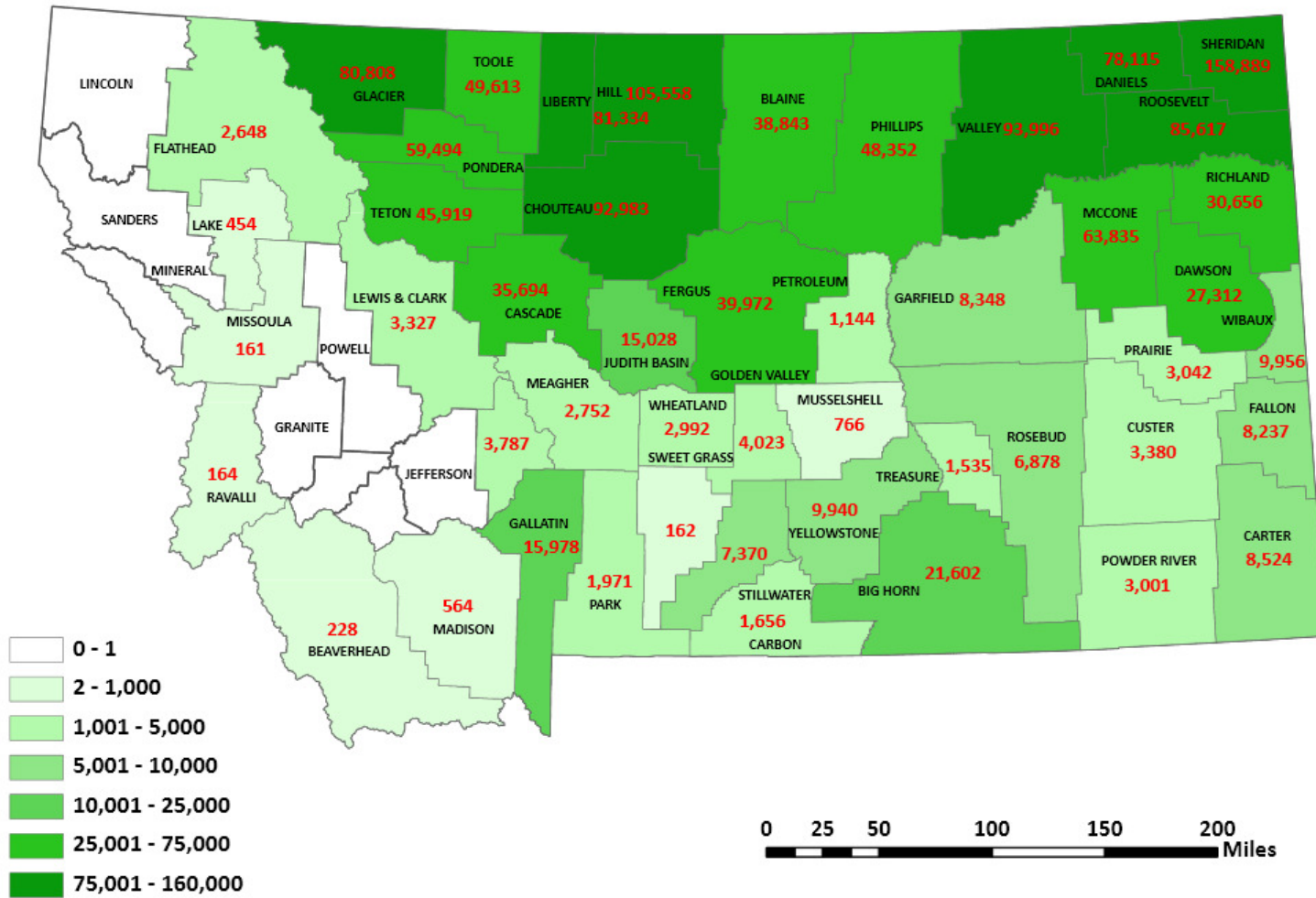
ILLUSTRATED REPLACEMENT OF FALLOW BY PULSE CROPS (in the next 5 – 15 years)

	Fallow: 2007-2010 Average (acres)	Estimated Replacement of Fallow by Pulse Crops (%)	Estimated Replacement of Fallow by Pulse Crops (acres)	% of Dry Cropland in Fallow (before Replacement)	% of Dry Cropland in Fallow (after Replacement)	2010 Dryland Pulse Acres	Projected Dryland Pulse Acres (excluding dryland pulse acres, where pulse crops replace other crops)
Cascade	102,801	31.25%	32,125	39.64%	27.25%	3,491	35,616
Chouteau	450,360	18.75%	84,442	45.04%	36.59%	8,676	93,118
Glacier	129,677	50.00%	64,839	36.43%	18.21%	12,421	77,260
Hill	394,568	25.00%	98,642	47.53%	35.64%	6,743	105,385
Liberty	220,475	31.25%	68,898	43.59%	29.97%	12,158	81,056
Pondera	170,127	31.25%	53,165	43.29%	29.76%	4,620	57,785
Teton	126,438	31.25%	39,512	42.22%	29.02%	5,395	44,907
Toole	233,779	18.75%	43,834	45.08%	36.63%	5,779	49,612
Golden Triangle	1,828,225	26.55%	485,457	43.92%	32.26%	59,283	544,740
Daniels	51,300	31.25%	16,031	13.04%	8.97%	61,941	77,972
Dawson	82,619	18.75%	15,491	30.96%	25.16%	11,761	27,252
McConne	106,756	37.50%	40,034	30.82%	19.26%	23,728	63,761
Richland	74,035	31.25%	23,136	28.19%	19.38%	7,352	30,487
Roosevelt	123,813	31.25%	38,692	25.01%	17.19%	46,902	85,593
Sheridan	37,958	12.50%	4,745	8.12%	7.11%	153,307	158,052
Valley	127,501	31.25%	39,844	25.72%	17.68%	53,985	93,829
Northeast MT	603,982	29.47%	177,972	22.14%	15.62%	358,975	536,947
Blaine	180,962	18.75%	33,930	47.57%	38.65%	4,841	38,771
Phillips	117,735	31.25%	36,792	44.87%	30.85%	11,322	48,114
Blaine-Phillips	298,698	23.68%	70,723	46.47%	35.46%	16,163	86,886
Fergus	111,513	31.25%	34,848	35.01%	24.07%	5,124	39,972
Judith Basin	33,831	37.50%	12,687	26.20%	16.37%	2,341	15,028
Central MT	145,344	32.70%	47,534	32.47%	21.85%	7,466	55,000
Big Horn	80,703	25.00%	20,176	40.81%	30.61%	1,426	21,602
Carbon	6,622	25.00%	1,656	46.02%	34.51%	0	1,656
Rosebud	35,555	12.50%	4,444	43.98%	38.49%	2,426	6,870
Stillwater	35,752	18.75%	6,703	43.58%	35.41%	715	7,418
Treasure	2,699	18.75%	506	40.75%	33.11%	1,029	1,535
Yellowstone	59,252	12.50%	7,406	38.40%	33.60%	2,534	9,940
Upper Yellowstone	220,582	18.54%	40,892	41.16%	33.53%	8,129	49,020
Custer	26,800	12.50%	3,350	51.79%	45.31%	30	3,380
Prairie	19,814	6.25%	1,238	35.87%	33.62%	1,635	2,873
Carter	24,354	25.00%	6,088	35.63%	26.72%	2,436	8,524
Fallon	21,682	18.75%	4,065	30.16%	24.50%	4,172	8,238
Powder River	14,925	6.25%	933	55.20%	51.75%	2,068	3,001
Wibaux	13,043	18.75%	2,446	20.67%	16.80%	7,510	9,955
Garfield	92,451	6.25%	5,778	48.21%	45.19%	2,570	8,348
Musselshell	12,249	6.25%	766	26.90%	25.22%	0	766
Petroleum	18,296	6.25%	1,144	48.26%	45.24%	0	1,144
Golden Valley	17,642	12.50%	2,205	37.80%	33.08%	1,818	4,023
Meagher	8,085	31.25%	2,526	38.16%	26.23%	83	2,610
Park	6,307	31.25%	1,971	43.98%	30.23%	0	1,971
Sweet Grass	862	18.75%	162	28.88%	23.46%	0	162
Wheatland	17,625	12.50%	2,203	28.43%	24.88%	777	2,980
Beaverhead	609	37.50%	228	57.44%	35.90%	0	228
Broadwater	14,800	25.00%	3,700	38.33%	28.75%	54	3,754
Gallatin	35,814	37.50%	13,430	41.78%	26.11%	823	14,253
Jefferson	241	0.00%	0	42.18%	42.18%	0	0
Lewis & Clark	8,367	25.00%	2,092	35.17%	26.38%	792	2,884
Madison	2,257	25.00%	564	36.91%	27.68%	0	564
Deer Lodge	141	0.00%	0	97.65%	97.65%	0	0
Flathead	4,455	6.25%	278	19.96%	18.71%	1,640	1,919
Granite	16	0.00%	0	100.00%	100.00%	0	0
Lake	3,230	12.50%	404	44.47%	38.91%	0	404
Lincoln	0	0.00%	0	0.00%	0.00%	0	0
Mineral	160	0.00%	0	36.53%	36.53%	0	0
Missoula	1,285	12.50%	161	69.49%	60.80%	0	161
Powell	132	0.00%	0	35.54%	35.54%	0	0
Ravalli	658	25.00%	164	43.98%	32.99%	0	164
Sanders	788	0.00%	0	59.43%	59.43%	0	0
Silver Bow	0	0.00%	0	0.00%	0.00%	0	0
Other Counties	367,048	15.23%	55,897	38.60%	32.73%	26,408	82,305
State Total	3,463,878	25.36%	878,475	36.59%	27.31%	476,422	1,354,897

Potential Replacement of Fallow with Pulse Crops (5 - 15 Years)



Potential Pulse Crop Acreage (5 - 15 Years)



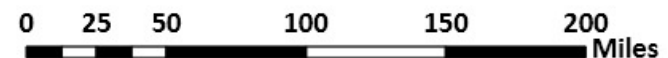
1,366,605 acres Total

of Fallow with Pulse Crops (5 - 15 Yrs)

Map showing Montana counties and their corresponding pulse crop production values (in dollars) for 2015. The values are color-coded by production volume.

Legend: \$44,019.00 - \$250,000.00

County	Production Value (\$)
Lincoln	\$0
Flathead	\$76,293
Sanders	\$0
Lake	\$110,647
Mineral	\$0
Missoula	\$44,019
Powell	\$0
Granite	\$0
Ravalli	\$45,053
Silver Bow	\$0
Beaverhead	\$62,601
Madison	\$154,654
Park	\$40,084
Sweet Grass	\$44,291
Glacier	\$17,767,739
Toole	\$12,011,713
Pondera	\$14,568,759
Teton	\$10,827,436
Lewis & Clark	\$513,219
Cascade	\$8,803,281
Gallatin	\$1,013,887
Meagher	\$692,335
Golden Valley	\$603,716
Wheatland	\$44,291
Hill Liberty	\$18,880,202
Chouteau	\$23,139,754
Judith Basin	\$9,549,309
Fergus	\$9,476,546
Musselshell	\$209,793
Yellowstone	\$2,029,594
Stillwater	\$453,688
Carbon	\$453,688
Blaine	\$9,626,063
Phillips	\$10,437,985
Petroleum	\$313,354
Garfield	\$1,583,391
Mccone	\$11,357,550
Prairie	\$339,343
Dawson	\$4,394,815
Richland	\$6,563,628
Wibaux	\$670,169
Valley	\$11,303,743
Roosevelt	\$10,976,797
Daniels	\$4,548,036
Sheridan	\$1,346,103
Custer	\$918,006
Fallon	\$1,114,035
Carter	\$1,668,398
Powder River	\$255,612
Big Horn	\$5,528,748
Treasure	\$138,676



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Illustration of Potential Irrigated Pulse Crop Production in Montana (*excluding dry beans*)

Region	Good Quality Irrigated Cropland (Acres)	Irrigated Acres Producing Non-forage Crops (Acres)	Estimate of Acres that Might be Switched to Pulse Production (Acres) / % of Irrigated Acres Producing Non-forage Crops
Golden Triangle	237,300	153,500	12,740 / 8.30%
Southwest	213,300	87,600	6,670 / 7.61%
Upper Yellowstone	203,400	111,000	6,390 / 5.76%
Northeast	139,700	81,100	5,270 / 6.50%
West	94,800	31,300	2,360 / 7.53%
Blaine/Phillips	70,500	16,700	1,330 / 7.95%
Other Counties	149,300	31,400	2,300 / 7.35%
Total	1,108,300	512,600	37,060 / 7.23%

Golden Triangle Counties: Cascade, Chouteau, Glacier, Hill, Liberty, Pondera, Teton, Toole

Southwestern Counties: Beaverhead, Broadwater, Gallatin, Jefferson, Lewis & Clark, Madison

Upper Yellowstone Counties: Bighorn, Carbon, Rosebud, Stillwater, Treasure, Yellowstone

Northeastern Montana Counties: Daniels, Dawson, McCone, Richland, Roosevelt, Sheridan, Valley

Western Montana Counties: Deer Lodge, Flathead, Granite, Lake, Lincoln, Mineral, Missoula, Powell, Ravalli, Sanders, Silver Bow

Illustrated Potential Irrigated Pulse Crop Acreage (5 - 15 Years)

